Impact of a mass media campaign to increase public awareness of hypertension

Bir kitle iletişim kampanyasının toplumda hipertansiyon farkındalığını artırmaya yönelik etkisi

M. Ali Oto, M.D.,[*] Oktay Ergene, M.D.,[#] Lale Tokgözoğlu, M.D.,[*] Zeki Öngen, M.D.,[†] Ömer Kozan, M.D.,[§] Mahmut Şahin, M.D.,[¶] M. Kemal Erol, M.D.,[&] Tuna Tezel, M.D.,[+] Mehmet Özkan, M.D.[δ]

Cardiology Departments of: [*]Medicine Faculty of Hacettepe University, Ankara; [#] İzmir Atatürk Training and Research Hospital, İzmir; [†]Cerrahpaşa Faculty of Medicine, İstanbul University, İstanbul; [§]Medicine Faculty of Dokuz Eylül University, İzmir; [¶]Medicine Faculty of 19 Mayıs University, Samsun; [&]Medicine Faculty of Atatürk University, Erzurum; [+]Siyami Ersek Cardiovascular Surgery Center, İstanbul; [δ]Kartal Koşuyolu Heart and Research Hospital, İstanbul

ABSTRACT

Objectives: We evaluated the effect of a nationwide media campaign on hypertension awareness in the population, which was implemented with the aim of spreading key messages related to optimal blood pressure levels and encouraging blood pressure measurements.

Study design: A nationwide project called "12/8 Awareness Campaign" was implemented between October 2005 and January 2006 using all available mass and outdoor media aiming to improve the knowledge of people on normal blood pressure values and to encourage regular blood pressure measurements. Four survey questions to inquire the level of awareness related to optimal blood pressure levels, hypertension, and hypertension-related disease conditions were directed via face-to-face interviews to two separate samples representing the general Turkish population before (n=1716) and after (n=1725) the campaign, respectively. The answers of the pre- and post-campaign individuals were compared.

Results: After the campaign, the percentage of participants who did not know their blood pressure levels decreased from 54.8% to 47.8%, the percentage of those who checked their blood pressure within the past two months increased from 34.3% to 39.6%, and the percentage of those who were aware of the optimal blood pressure levels rose from 51.8% to 58.6% (p<0.001).

Conclusion: The campaign contributed significantly to the awareness of hypertension in general population, which is highly encouraging for future efforts for early detection of hypertension and prevention of related morbidity and mortality.

ÖZET

Amaç: Optimal kan basıncı düzeylerine yönelik ana mesajları yaymak ve kan basıncı ölçümünü teşvik etmek amacıyla ülke çapında yürütülen bir medya kampanyasının toplumdaki hipertansiyon farkındalığına olan etkisi değerlendirildi.

Çalışma planı: Ekim 2005 ile Ocak 2006 tarihleri arasında "12/8 Farkındalık Kampanyası" adı altında, normal kan basıncı düzeylerine yönelik bilgi düzeyinin artırılması ve düzenli kan basıncı ölçümünün teşviki amacıyla tüm kitle iletişim araçlarının kullanıldığı bir kampanya yürütüldü. Optimal kan basıncı düzeyleri, hipertansiyon ve hipertansyonla ilişkili hastalık durumlarına yönelik dört araştırma sorusunu içeren anket formları, genel Türk toplumunu temsil eden iki ayrı örnekleme, kampanya öncesinde (n=1716) ve sonrasında (n=1725) yüz yüze görüşme yöntemiyle uygulandı. Katılımcıların kampanya öncesi ve sonrası yanıtları karşılaştırıldı.

Bulgular: Kampanya öncesiyle karşılaştırıldığında, kampanya sonrasında kendi kan basıncı düzeyi hakkında bilgi sahibi olmayan kişilerin oranı %54.8'den %47.8'e belirgin azalma gösterirken, son iki ay içinde kan basıncı ölçümü yaptıranların oranı %34.3'ten %39.6'ya, optimal kan basıncı düzeyini bilenlerin oranı ise %51.8'den %58.6'ya yükseldi (p<0.001).

Sonuç: Yürütülen kampanya, toplumda hipertansiyona yönelik farkındalığın artırılmasına belirgin şekilde katkıda bulunmuştur. Bu başarı, hipertansiyonun erken tanısı ve ilişkili morbidite ve mortalitenin önlenmesi bakımından gelecekteki girişimler adına oldukça yüreklendiricidir.

Received: March 1, 2011 *Accepted:* April 5, 2011

Correspondence: Dr. M. Ali Oto. Hacettepe Üniversitesi Tıp Fakültesi, Kardiyoloji Anabilim Dalı, 06100 Sıhhiye, Ankara, Turkey.
Tel: +90 312 - 305 17 80 e-mail: alioto@superonline.com

During the last century, cardiovascular diseases became the leading cause of morbidity and mortality. Total cardiovascular deaths from coronary heart disease, stroke, and other forms of cardiovascular diseases are expected to almost double from 13.1 million in 1990 to 24.8 million in 2020. High blood pressure is a major independent risk factor for cardiovascular diseases, particularly for stroke.[1-4] Data from epidemiological and observational studies have demonstrated increasing risk for stroke, myocardial infarction, cardiovascular death, and all-cause mortality associated with high blood pressure.

Turkey has a population of more than 70 million, with a characteristic dominance of young age (54% of the population are under the age of 30). In Turkey, cardiovascular disease is the leading cause of death, with the highest estimated age-adjusted coronary heart disease rate in Europe.[5] A nationwide study designed to assess the global cardiovascular risk in adults found the prevalence of hypertension as 36% in men and 49% in women aged 30 years.[6] The prevalence, awareness, treatment, and control of hypertension in the PatenT study which was carried out in a large cohort of Turkish adult population revealed the overall age- and sex-adjusted prevalence of hypertension as 31.8%.[7] Among 1804 subjects with hypertension, 1070 subjects (59.3%) were not aware of their hypertension, 31.1% were receiving pharmacological treatment, and only 8.1% had their blood pressure under control. The PatenT study also demonstrated that more than one-fifth of normotensive adult population and more than 40% of normotensive young adult population (18-29 years of age) had high-normal blood pressure. Another striking finding of the PatenT study was the high percentage of people (32.2%) who had never had their blood pressure checked. The fact that blood pressure has never been measured in nearly one-third of the Turkish adult population over 18 years of age (representing approximately 16 million people) addresses the urgent need for population-based strategies to improve the prevention and early detection of hypertension in Turkey.

In the light of the above-mentioned information, a nationwide hypertension awareness campaign called "12/8 Awareness Campaign" was designed and conducted between October 2005 and January 2006 using all available mass and outdoor media. The objectives of the project were to evaluate the basal level of hypertension awareness in the population; then to direct a nationwide media campaign including key messages related to optimal blood pressure levels and encouraging blood pressure measurements; and to assess if the level of hypertension awareness in the population showed any improvement after the campaign. Overall, these objectives aimed to provide a better picture of the awareness of hypertension in general population.

MATERIALS AND METHODS

Study design and protocol

The 12/8 Awareness Campaign project initiated by the Turkish Society of Cardiology in collaboration with the Turkish Ministry of Health is a quasi-interventional epidemiological study designed to assess the effect of public education on hypertension awareness. Face-to-face interviews with the individuals on the street nationwide were conducted by trained interviewers before and after the public education campaign. In the first part of the study, four pre-prepared survey questions were directed to a sample population (pre-campaign participants). Then, a three-month mass media campaign project was initiated. Finally, immediately after the completion of the campaign, the same survey questions were directed to another population (post-campaign participants) which was almost identical to the pre-campaign participants. In addition, individuals were stratified according to systolic and diastolic blood pressure values based on The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Pressure guide of the National Heart, Lung, and Blood Pressure Institute.[8] The database comprised of 2,000 subjects among people on the street.

Survey questions

The survey aimed to assess the baseline awareness of hypertension and to determine if the campaign con-

Figure 1. The map of Turkey demonstrating the cities where the campaign activities were conducted. Both the pre- and post-campaign populations were selected from 18 cities in seven geographical regions (showed with different colors on the map) to represent the general population of the country.

Table 1. Demographic characteristics of the pre- and post-campaign participants

	Pre-campaign (n=1716) Mean age 38.2±14.6 yrs		Post-campaign (n=1725) Mean age 36.9±14.7 yrs		
	n	%	n	%	*p*
Gender					0.987
Female	864	50.4	869	50.4	
Male	852	49.7	856	49.6	
Age categories (years)					0.067
18-24	361	21.0	399	23.1	
25-34	440	25.6	484	28.1	
35-44	361	21.0	358	20.8	
45-54	277	16.1	246	14.3	
≥55	277	16.1	238	13.8	
Place of residence					0.291
Urban	1168	68.1	1145	66.4	
Rural	548	31.9	580	33.6	
Education status					0.412
Illiterate	60	3.6	63	3.7	
Elementary school	858	50.8	814	48.3	
High school	638	37.8	656	38.9	
University	124	7.3	148	8.8	
Master	9	0.5	6	0.4	
Socioeconomic status*					0.074
Very high	13	0.9	27	1.6	
High	109	7.7	123	7.1	
High-medium	329	23.2	333	19.3	
Low-medium	889	62.8	836	48.5	
Low + Very low	76	5.4	406	23.5	

*Socioeconomic status was determined based on individuals' education, income level, and occupation.

tributed to increased awareness and improved knowledge about optimal blood pressure levels, hypertension, and hypertension-related disease conditions. For this purpose, the following four questions were asked:

1. Do you know your blood pressure values? (If yes, what is your blood pressure value?)
2. Have you checked your blood pressure within the last two months?
3. Do you know the optimal blood pressure levels?
4. Do you know the complications of hypertension? (If the respondents gave a positive answer to this question, the interviewers asked if they knew the names of disease conditions related to high blood pressure.)

Public education campaign interventions

A mass media campaign incorporating television, radio, and print was developed and implemented during October 2005 and January 2006.

Radio spots. To attract public attention to hypertension, many radio spots (6 spots per day) were prepared for broadcasting on 19 national radio stations. The key media messages presented were "The ideal blood pressure value is 12/8. Please measure your blood pressure today." and "Hypertension is a silent disease with no sign. Please measure your blood pressure today."

TV programs. TV programs to inform the audience about hypertension were aired for seven weeks in six

Table 2. Distribution of positive responses to Question 1* with respect to gender, age, and socioeconomic status in the pre- and post-campaign participants

	Pre-campaign		Post-campaign		
	n	%	n	%	*p*
Overall	776 / 1716	45.2	901 / 1725	52.2	**<0.001**
Gender					
Female	432 / 864	50.0	503 / 869	57.9	**<0.001**
Male	344 / 852	40.4	398 / 856	46.5	**0.012**
Age categories (years)					
18-24	104 / 361	28.8	142 / 399	35.6	**0.046**
25-34	177 / 440	40.2	230 / 484	47.5	**0.026**
35-44	172 / 361	47.7	203 / 358	56.7	**0.015**
45-54	148 / 277	53.4	169 / 246	68.7	**<0.001**
≥55	175 / 277	63.2	157 / 238	66.0	0.510
Socioeconomic status**					
Very high+High	71 / 122	58.2	108 / 150	72.0	**0.017**
High-medium	166 / 329	50.5	184 / 333	55.3	0.216
Low-medium	406 / 889	45.7	443 / 836	53.0	**0.002**
Low+Very low	27 / 76	35.5	166 / 406	40.9	0.113

*Question 1: "Do you know your blood pressure values?" **Socioeconomic status was determined based on individuals' education, income level, and occupation.

national TV channels. The format was to collect the most frequently asked questions regarding hypertension by the general public and to direct them to cardiologists in each episode.

Advertisements. These included printed materials, billboard advertisements and posters. Printed advertisements were distributed to 10 national newspapers and posters were posted on buses, on the bulletin boards at hospitals and malls around the country. Printed advertisements on plastic bags and various accessories were also delivered to pharmacies and drugstores. The key message on the printed material was *"Is your blood pressure under control? The optimal blood pressure level is 12/8.* Please measure your blood pressure."* Newspaper advertisements and posters included not only the key messages, but also Trues/Falses regarding high blood pressure. (*Since the unit of blood pressure measurement is widely known as cmHg among lay people in Turkey, the optimal level was given as 12/8.)

Statistical analysis

Descriptive analysis was used to define the demographics of the pre- and post-campaign participants. Data were presented as mean±SD or numbers and percentages where appropriate. For the comparison of the variables the chi-square test, Fisher's test, or Student's t-test were used. Statistical analyses were performed using SPSS version 12.0 and the results were considered statistically significant at a level of $p<0.05$.

RESULTS

Demographic characteristics of the pre- and post-campaign participants

The pre- and post-campaign surveys were conducted in 1716 and 1725 subjects ≥18 years of age, respectively. Both the pre- and post-campaign participants were selected from 18 cities representing seven geographical regions of the country. Figure 1 demonstrates the cities where the campaign activities were conducted on the map of Turkey. Table 1 summarizes the demographic characteristics including age, gender, place of residence, socioeconomic and educational status of the pre- and post-campaign survey participants. None of the variables presented in Table 1 demonstrated a statistically significant difference between the two groups of participants.

The answers to the survey questions

Question 1. Table 2 shows the distribution of the pre- and post-campaign participants with respect to posi-

Table 3. Blood pressure levels of the pre- and post-campaign participants

	Pre-campaign (n=776)		Post-campaign (n=901)		
	n	%	n	%	*p*
Systolic blood pressure					**0.003**
Normal	204	26.3	221	24.5	
Prehypertension	381	49.1	494	54.8	
Grade 1 hypertension	126	16.2	96	10.7	
Grade 2 hypertension	65	8.4	90	10.0	
Diastolic blood pressure					0.163
Normal	261	33.6	280	31.1	
Prehypertension	325	41.9	424	47.1	
Grade 1 hypertension	101	13.0	112	12.4	
Grade 2 hypertension	89	11.5	85	9.4	

tive answers to Question 1. Before the campaign, the percentage of people who gave a positive answer to this question was the highest in the oldest age category (≥55 years) and the lowest in the age category of 18-24 years. Females seemed to be more aware of their blood pressure levels than males (49.9% *vs.* 40.4%). The level of blood pressure awareness was the highest in people with very high+high socioeconomic status. Awareness showed a marked reduction as the individuals' socioeconomic status decreased. The order of percentages within the specified categories of the pre- and post-campaign participants was the same.

The percentage of people who did not know his/her blood pressure level before the campaign decreased from 54.8% (n=940) to 47.8% (n=824) after the campaign (p<0.001). Conversely, the awareness increased from 45.2% to 52.2% (Table 2).

Analysis of blood pressure levels of the pre-and post-campaign groups that knew their blood pressure values demonstrated that 26.3% and 33.6% of the pre-

Table 4. Distribution of positive responses to Question 2* with respect to gender, age, and socioeconomic status in the pre- and post-campaign participants

	Pre-campaign		Post-campaign		
	n	%	n	%	*p*
Overall	589 / 1716	34.3	683 / 1725	39.6	**<0.001**
Gender					
Female	326 / 864	37.7	381 / 869	43.8	**0.010**
Male	263 / 852	30.9	302 / 856	35.3	0.053
Age categories (years)					
18-24	82 / 361	22.7	98 / 399	24.6	0.550
25-34	120 / 440	27.3	164 / 484	33.9	**0.030**
35-44	129 / 361	35.7	149 / 358	41.6	0.105
45-54	117 / 277	42.2	134 / 246	54.5	**0.005**
≥55	141 / 277	50.9	138 / 238	58.0	0.108
Socioeconomic status**					
Very high+High	53 / 122	43.4	78 / 150	52.0	0.160
High-medium	119 / 329	36.2	162 / 333	48.7	**0.001**
Low-medium	312 / 889	35.1	320 / 836	38.3	0.170
Low+Very low	21 / 76	27.9	123 / 406	30.3	0.466

*Question 2: "Have you checked your blood pressure within the last 2 months?" **Socioeconomic status was determined based on individuals' education, income level, and occupation.

Table 5. Distribution of positive responses to Question 3* with respect to gender, age, and socioeconomic status in the pre- and post-campaign participants

	Pre-campaign		Post-campaign		
	n	%	n	%	*p*
Overall	888 / 1716	51.8	1011 / 1725	58.6	**<0.001**
Gender					
Female	458 / 864	53.0	381 / 869	61.4	**<0.001**
Male	430 / 852	50.5	302 / 856	55.7	**0.030**
Age categories (years)					
18-24	146 / 361	40.4	98 / 399	58.4	**0.028**
25-34	209 / 440	47.5	164 / 484	59.3	**<0.001**
35-44	206 / 361	57.1	149 / 358	59.2	0.558
45-54	147 / 277	53.1	134 / 246	66.7	**0.002**
≥55	180 / 277	65.0	138 / 238	65.1	0.973
Socioeconomic status**					
Very high+High	77 / 122	63.1	78 / 150	76.0	**0.021**
High-medium	204 / 329	62.0	162 / 333	68.2	0.096
Low-medium	474 / 889	53.3	320 / 836	59.4	**0.010**
Low+Very low	27 / 76	35.5	123 / 406	42.6	**0.038**

*Question 3: "Do you know the optimal blood pressure levels?" **Socioeconomic status was determined based on individuals' education, income level, and occupation.

campaign group, and 24.5% and 31.1% of the post-campaign group were normotensive based on systolic and diastolic blood pressure levels, respectively (Table 3). The percentage of pre-hypertensives showed a significant increase after the campaign (p<0.001).

Question 2. Similar to the results of Question 1, analysis of the answers to Question 2 before the campaign demonstrated that the percentage of the respondents who checked their blood pressure levels within the past two months were the highest in the age category

Table 6. Distribution of positive responses to Question 4* with respect to gender, age, and socioeconomic status in the pre- and post-campaign participants

	Pre-campaign		Post-campaign		
	n	%	n	%	*p*
Overall	1324 / 1716	77.2	1267 / 1725	73.5	
Gender					
Female	694 / 864	80.3	664 / 869	76.4	0.048
Male	630 / 852	73.9	603 / 856	70.4	0.107
Age categories (years)					
18-24	244 / 361	67.6	251 / 399	62.9	0.176
25-34	340 / 440	77.3	354 / 484	73.1	0.147
35-44	276 / 361	76.5	286 / 358	79.9	0.265
45-54	230 / 277	83.0	198 / 246	80.5	0.451
≥55	234 / 277	84.5	178 / 238	74.8	**0.006**
Socioeconomic status**					
Very high+High	105 / 122	86.1	135 / 150	90.0	0.317
High-medium	265 / 329	80.6	250 / 333	75.1	0.090
Low-medium	687 / 889	77.3	613 / 836	73.3	0.057
Low+Very low	54 / 76	71.1	269 / 406	66.3	0.153

*Question 4: "Do you know the complications of hypertension?" **Socioeconomic status was determined based on individuals' education, income level, and occupation.

Table 7. Awareness about specific complications of hypertension among pre- and post-campaign participants

	Pre-campaign (n=1324)		Post-campaign (n=1267)		
	n	%	n	%	*p*
Stroke	702	53.0	680	53.7	0.373
Cerebral hemorrhage	455	34.4	517	40.8	**0.024**
Sudden death	207	15.6	182	14.4	0.161
Heart attack	144	10.9	215	17.0	**<0.001**
Vertigo	133	10.1	147	11.6	0.408
Cardiac disease	105	7.9	92	7.3	0.321
Headache/migraine/neck pain	68	5.1	56	4.4	0.260
Vessel obstruction	47	3.6	62	4.9	0.152
Renal disease	9	0.7	14	1.1	0.301

of ≥55 years and in those having a very high+high socioeconomic status (Table 4). The order of percentages of specified categories of the pre- and post-campaign participants was the same.

The comparison of answers before and after the campaign showed that the percentage of people who checked their blood pressure within the past two months increased from 34.3% (n=589) to 39.6% (n=683) after the campaign (p<0.001).

Question 3. Similarly, the percentage of people giving a positive answer to Question 3 showed a marked increase after the campaign. The percentage of people who knew the optimal pressure levels increased from 51.8% (n=888) to 58.6% (n=1011) after the campaign (p<0.001) (Table 5). Awareness of the optimal blood pressure levels before the campaign was seen in 65% and 40.4% in the age groups of ≥55 years and 18-24 years, respectively. The highest percentage of unawareness (64.5%) about the optimal blood pressure levels before the campaign was seen in the very low+low socioeconomic status group.

Question 4. Table 6 demonstrates the percentages of pre- and post-campaign participants who declared that they knew about complications of hypertension. When the complications were inquired separately, awareness on cerebral hemorrhage (p=0.024) and heart attack (p<0.001) was found to be significantly increased after the campaign period (Table 7).

A graphical demonstration of the percentages of pre- and post-campaign participants along with their answers is given in Figure 2.

DISCUSSION

Over the past two decades, international and national initiatives and programs have been remarkably successful in increasing the awareness, treatment, and control of hypertension.[9] The National Health and Nutrition Examination Survey (NHANES) is a large health and nutritional survey that has been highly useful for monitoring health status of the population with its large sample size, complex sampling design, good quality control, and comprehensive content.[10] According to the NHANES data on 1999-2000, 28.7% of the population had hypertension. Among hypertensives, 68.9% were aware of the diagnosis, 58.4% received treatment, and blood pressure was under control in only 31%.[11] According to the NHANES data for 2003-2004, the prevalence of hypertension did not increase from the 1999-2000 phase, which may be a consequence of better publicity, education, and greater efforts of health professionals. The increase in blood pressure control rates may be related to the use of clinical guidelines on the management of hypertension rather than improvements in antihypertensive drugs, because there were no new major antihypertensive drugs introduced in that period.

Despite the existence of guidelines for detection and management of hypertension and the high proportion of well-controlled hypertensive patients in clinical trials, hypertension control in the general population still poses a major problem. For more than 50 years, communication campaigns have been used to influence the attitudes and behaviors of individuals to a wide variety of subjects including the environment, safety, health, and policy issues. After

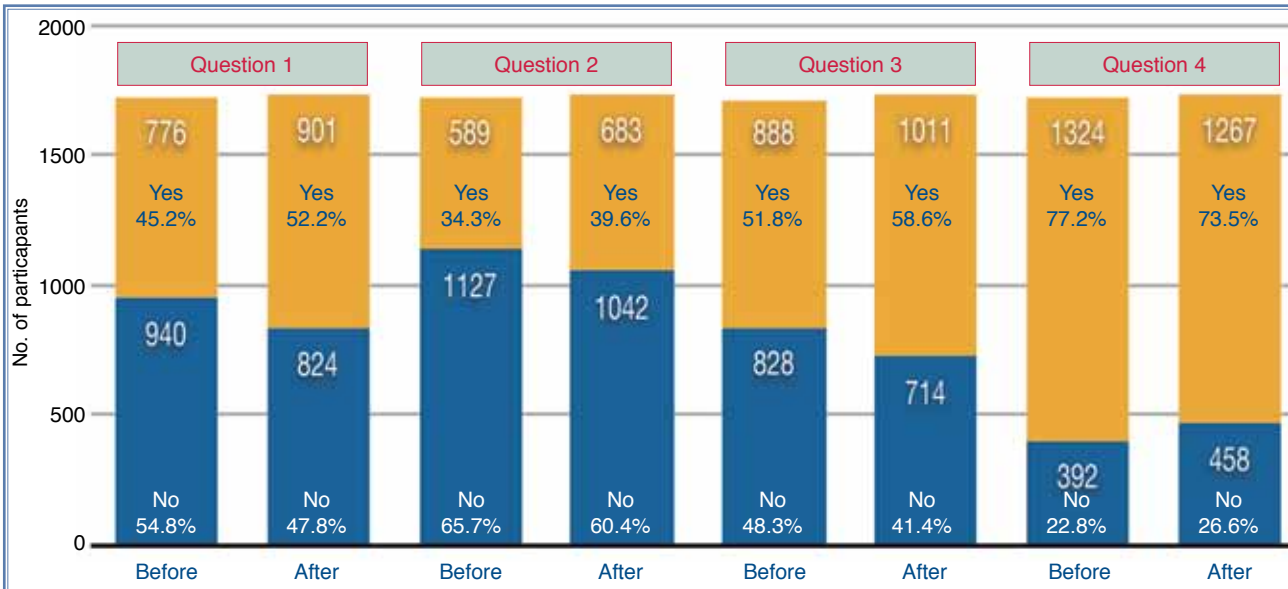

Figure 2. Graphical demonstration of the percentages of pre- and post-campaign answers based on "Yes" and "No". Question 1: "Do you know your blood pressure values?"; Question 2: "Have you checked your blood pressure within the last 2 months?"; Question 3: "Do you know the optimal blood pressure levels?"; Question 4: "Do you know the complications of hypertension?"

the National High Blood Pressure Education Program (NHBPEP) mass media campaign was initiated in 1972, detection, awareness, knowledge, and treatment of high blood pressure have increased dramatically in the USA.[12] Since then, approximately 92% of the Americans know that high blood pressure cannot be cured spontaneously and that a person must stay on treatment,[13] 91% know that high blood pressure increases the risk for heart disease; and 77% know that high blood pressure increases the risk for stroke.[12] Moreover, the rate of age-adjusted stroke mortality declined by more than 52% from 1972 to 1986 in the USA.[12]

This three-month campaign presented here consisted of a series of television and radio public service announcements, print advertisements, posters, and collateral print materials aiming to raise public awareness of hypertension. Although it was a short-duration campaign, almost all modern communication tools were used and very striking results were obtained. The impact of the campaign was evaluated by comparing the percentages of almost identical populations answering to four survey questions that were developed to demonstrate the level of public awareness of hypertension before and after the campaign. Pre- and post-campaign populations were similar with respect to demographic characteristics and representative features of the general Turkish population. Descriptive analysis of campaign data revealed that the majority of both populations were in the age category of 25-34 years, were living in the urban, had elementary school education, and had a low-medium socioeconomic status. Of the pre-campaign participants, 45.2% were aware of their blood pressure levels and 34.3% had their blood pressure measured in the previous two months. After the campaign, the percentages of people who were unaware of their blood pressure and who did not check it within the past two months decreased significantly (from 54.8% to 47.8% and from 65.7% to 60.4%, respectively). When the participants were categorized based on the declared systolic blood pressure levels, we observed that approximately half of the pre-campaign participants (49.1%) and 54.8% of the post-campaign participants had prehypertension (Table 3). Although this analysis was based on the responses, not on measurements, the high percentage of prehypertensives in the population and its elevation after the campaign point out the fact that raising public awareness of hypertension will help early detection and management.

Another striking finding of the study was that nearly half of the pre-campaign participants (48.3%) did not know the optimal blood pressure levels and this rate significantly decreased to 41.4% after the campaign. Among the pre-campaign participants who responded "yes" to the first three questions, those at higher ages (≥55 years) and having a very high+high socioeconomic status always represented the highest percentage. Moreover, women were also

found to be more aware than men, as demonstrated in several studies.[14,15] Among hypertension-related complications, stroke and cerebral hemorrhage were the two most frequently reported conditions both before and after the campaign. These two conditions were followed by sudden death and heart attack. On the other hand, cerebral hemorrhage and heart attack were the two hypertension-related complications, of which the level of awareness raised significantly after the campaign. Overall, our pre-campaign data demonstrated poor baseline awareness of optimal blood pressure levels, hypertension, and hypertension-associated disease conditions in a wide population representing the general population. On the other hand, the post-campaign data demonstrated that campaign messages were effective in increasing awareness and encouraging detection of hypertension. Our findings were in accordance with those of the PatenT study which showed that 59.3% of people with hypertension were unaware of their illness and 32.2% had never had their blood pressure checked.[7] The PatenT study also demonstrated that 53% of hypertensives were in the middle age group and a non-negligible proportion of 12% were in the age group of 18-29 years. Thus, more than one-fifth of the normotensive adult population and more than 40% of the normotensive young adult population (18-29 years of age) had high-normal blood pressure. When these observations were compared with those of the present study, we noted that individuals in the age groups of both 18-24 years and 25-34 years comprised the majority of the population who were unaware of both the optimal blood pressure levels and their own blood pressure values. Considering the fact that Turkey has a young population (54% of the population is under the age of 30), the low level of awareness found in this study indicates the necessity of developing and establishing more effective population-based strategies to improve prevention and early detection of hypertension in the country.

The most important limitation of this study was that the level of initial awareness may decrease over time. Thus, it is crucial to repeat such surveys at a regular basis if lasting improvements in blood pressure, awareness, and control are to be achieved.

In conclusion, the results of this campaign study indicate that special preventive efforts should continue to increase awareness of hypertension in population, particularly in young population to reduce the prevalence of hypertension in the future. Taking this as a pilot study, a nationwide project by the Ministry of Health in collaboration with universities and other parties aiming to increase public awareness of hypertension and its risks will be highly appreciated. Such a project may include not only mass media activities, but also all other available tools including direct education of youngsters at school. Periodical reassessments of the impact should be planned as well.

Acknowledgements

The authors are very grateful to Turkish Ministry of Health for their valuable collaboration and support during the launch of the campaign and Novartis for the unrestricted grant and logistic support to realize the study.

Conflict-of-interest issues regarding the authorship or article: None declared

REFERENCES

1. Gordon T, Kannel WB. Premature mortality from coronary heart disease. The Framingham study. JAMA 1971;215:1617-25.
2. Kannel WB, Dawber TR, Kagan A, Revotskie N, Stokes J 3rd. Factors of risk in the development of coronary heart disease-six year follow-up experience. The Framingham Study. Ann Intern Med 1961;55:33-50.
3. Kannel WB, Belanger AJ. Epidemiology of heart failure. Am Heart J 1991;121:951-7.
4. Stamler J, Stamler R, Neaton JD. Blood pressure, systolic and diastolic, and cardiovascular risks. US population data. Arch Intern Med 1993;153:598-615.
5. Onat A. Risk factors and cardiovascular disease in Turkey. Atherosclerosis 2001;156:1-10.
6. Soydan İ. Hipertansiyonla ilgili TEKHARF çalışması verileri ve yorumu. In: Onat A, editor. On iki yıllık izleme deneyimine göre Türk erişkinlerinde kalp sağlığı. İstanbul: Argos İletişim; 2003. s. 60-71.
7. Altun B, Arıcı M, Nergizoğlu G, Derici U, Karatan O, Turgan C, et al. Prevalence, awareness, treatment and control of hypertension in Turkey (the PatenT study) in 2003. J Hypertens 2005;23:1817-23.
8. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. JAMA 2003;289:2560-72.
9. Kearney PM, Whelton M, Reynolds K, Whelton PK, He J. Worldwide prevalence of hypertension: a systematic review. J Hypertens 2004;22:11-9.
10. Roccella EJ, Bowler AE, Ames MV, Horan MJ. Hypertension knowledge, attitudes, and behavior: 1985 NHIS findings. Public Health Rep 1986;101:599-606.

11. Hajjar I, Kotchen TA. Trends in prevalence, awareness, treatment, and control of hypertension in the United States, 1988-2000. JAMA 2003;290:199-206.
12. National Heart, Lung and Blood Institute: Public perceptions of high blood pressure and sodium. NIH Publication No. 86-2730. NHLBI, Bethesda, MD, 1986.
13. Centers for Disease Control and Prevention. National Center for Health Statistics [Internet]. National Health and Nutrition Examination Survey. Available from: http://www.cdc.gov/nchs/nhanes.htm.
14. Echeverría RF, Camacho RO, Carbajal HA, Salazar MR, Mileo HN, Riondet B, et al. Knowledge and treatment of hypertension in La Plata, Argentina. Medicina 1989;49:53-8. [Abstract]
15. Plasencia A, Ostfeld AM, Gruber SB. Effects of sex on differences in awareness, treatment, and control of high blood pressure. Am J Prev Med 1988;4:315-26.

Key words: Awareness; blood pressure; health knowledge; hypertension/epidemiology/prevention & control; questionnaires; Turkey/epidemiology.

Anahtar sözcükler: Farkındalık; kan basıncı; sağlık bilgisi; hipertansiyon/epidemiyoloji/önleme ve kontrol; anket; Türkiye/epidemiyoloji.